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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,832	10/03/2005	Ptoshia Avon Burnett	608-440	2285
23117	7590	11/27/2006		
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				
			EXAMINER SINGH, PREM C	
			ART UNIT 1764	PAPER NUMBER

DATE MAILED: 11/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/509,832

Applicant(s)

BURNETT ET AL.

Examiner

Prem C. Singh

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 15-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>09/30/2004, 10/20/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Specification*

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested:

"Removal of nitrogen, sulfur, and alkylating agents from hydrocarbon streams".

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 15-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huff, Jr. et al (US Patent 6,048,451).

6. With respect to claim 15, Huff discloses a process for producing a product of reduced sulfur, nitrogen, and alkylating agents content.

Huff discloses, "The basic nitrogen-containing impurities can be removed from the feedstock by using a guard bed which is positioned in front of the acid catalyst. Examples of effective guard beds include A-zeolite, Y-zeolite, L-zeolite, mordenite, and acidic polymeric resins." (Column 10, lines 54-59). "Preferred feed stocks include liquids which boil below 345°C, such as light naphtha, heavy naphtha, distillate and light cycle oil. The entire output of volatile products from a catalytic cracking process can be utilized as a feedstock." (Column 8, lines 65-67; column 9, lines 1-4). "Many of the typical nitrogen-containing impurities are organic bases." (Column 10, lines 48-49). "The

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feedstock contains an amount of alkylating agent.” (Column 4, lines 41-42). “One guard bed can be regenerated while the other is being used to pretreat the feedstock.” (Column 10, lines 61-62).

Huff also discloses generating a secondary feedstock by removing basic nitrogen-containing impurities from the cracking products (see claim 17, column 22, lines 27-29).

Huff does not specifically mention about reduced alkylating agent and nitrogen species of higher boiling point, but the invention does mention about conversion of sulfur-containing impurities to higher boiling products involving the alkylation of these impurities with alkylating agent (see column 7, lines 42-47). Since both nitrogen and sulfur impurities are being removed using acidic polymeric resin (see column 9, lines 60-61 and column 10, lines 58-59) under similar operating conditions, it would have been obvious to one skilled in the art at the time the invention was made to modify Huff invention and remove nitrogen, sulfur, and alkylating agents from cracked products.

7. Claim 16 has all the limitations of claim 15 and additionally, requires a step of removing nitrogen compounds from the hydrocarbon liquid. Huff discloses a similar step in claim 17 (see column 22, lines 27-29).

8. With respect to claim 17, Huff does not specifically mention using fractionation to remove nitrogen impurities. But the invention does disclose using fractionation to remove sulfur impurities (see claim 17, column 22, lines 36-40). Thus, it would have

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been obvious to one skilled in the art at the time the invention was made to modify Huff invention and remove nitrogen compounds also by fractionation because any suitable separation technique will be equally effective.

9. Claim 18 has all the limitations of claims 15-17, and additionally requires removal of sulfur impurities.

Huff invention discloses removal of sulfur impurities from catalytically cracked vapor streams like naphtha, using an acidic catalyst (see column 5, lines 5-25).

10. Claim 19 has all the limitations of claims 16 and 18, and additionally requires using two reaction zones.

Huff invention uses acidic polymeric resin in two zones: first to remove nitrogen, and the second to remove sulfur (see column 9, lines 58-65; column 10, lines 54-59).

11. With respect to claim 20, Huff discloses the feed such as light naphtha, heavy naphtha, distillate and light cycle oil (see column 8, lines 65-67; column 9, line 1). Huff further adds, "Liquids of this type with a boiling range of 10°C to 345°C are distillate hydrocarbons like light naphtha, heavy naphtha, kerosene, and light cycle oil." (Column 4, lines 13-17).

12. With respect to claim 21, although Huff does not specifically mention about nitrogen species, the invention does disclose, "Many of the typical nitrogen-containing

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impurities are organic bases.” (Column 10, lines 48-49). Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Huff invention and remove all the typical impurities of nitrogen compounds, including the claimed species.

13. With respect to claim 22, although Huff does not specifically mention about the total nitrogen content, the invention does disclose, “The feed stocks will occasionally contain nitrogen-containing organic compounds as impurities in addition to the sulfur containing impurities.” (Column 10, lines 45-48). Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Huff invention and specify nitrogen content of the feed to calculate the amount of acidic resin needed for its proper removal from hydrocarbon feed.

14. With respect to claim 23, although Huff does not specifically mention about the boiling point of nitrogen species, the invention does disclose the presence of nitrogen impurities. Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Huff invention and specify the boiling point of nitrogen species for their proper removal in the distillation process.

15. With respect to claims 24 and 26, Huff discloses, “The sulfur-containing impurities include mercaptans, thiophene, thiophene derivatives, benzothiophene, benzothiophene derivatives.” (Column 9, lines 24-30).

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16. With respect to claims 25 and 27, Huff discloses total sulfur content of naphtha feed to be 730 ppm (see column 16, lines 34-36).

17. With respect to claim 28, Huff discloses, "Solid acidic catalysts are particularly desirable." (Column 9, lines 43-44).

18. With respect to claims 29-31, although Huff does not specifically mention about temperature and pressure in different zones, the invention does disclose using the catalyst beds at a temperature of 50 to 450°C and pressure of 0.01 to 200 atmospheres (1 atm = 1.013 bar) (see column 11, lines 10-12; lines 50-53). Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Huff invention and specify the temperature and pressure conditions in the two zones separately.

### ***Conclusion***

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Collins et al, US Patent 5,599,441.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prem C. Singh whose telephone number is 571-272-6381. The examiner can normally be reached on MF 6:30 AM-3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PS/111606

  
